KANSAS

Department of Health and Environment

Environmental Quality Facts

Contamination Risks to Private Water Wells

In the Spring and Summer of 1994, KDHE conducted a statewide survey of about 1,000 private wells. Wells in every Kansas county were checked for four pollutants: atrazine, bacteria, lead, and nitrate.

This fact sheet gives (1) guidelines -- concentration levels that, when exceeded, pose health risks; (2) Kansas' test results; (3) possible health risks each contaminant poses; and (4) what can be done to correct the problem or reduce the health risks.

Because of the variability of groundwater and other factors that affect quality, survey results do not mean that a given percentage of wells statewide are experiencing these problems. The water quality problems in your well may be better or worse.

The survey reaffirms there are contamination threats occurring in private wells and given sufficient concentration may pose a health risk.

There are a number of helpful tools to assess the siting and quality of water wells on your property. This information is available from local environmental protection program sanitarians or from county extension agents.

A list of helpful publications for correcting well problems is provided at the end of this fact sheet.

Sensible Precautions

Water contaminants can come from sources such as fuel, feed, chemical storage, livestock facilities, septic system, waste lagoon, or cleaning farm equipment.

To minimize contamination requires basic, common-sense steps:

- Place wells uphill from any of the above sources so rain water won't wash pollutants toward the well.
- Plug any abandoned wells. They provide direct routes to groundwater and can affect water in active wells. Never use them for dumping or disposal.
- Upgrade wells to present standards (contact KDHE Bureau of Water at 785-296-5500).
- Make sure wells are 200-500 feet from livestock areas, waste facilities, and silos.

Store, transfer, and clean up all chemicals and fertilizers at least 400 feet from a well. Stop using, clean, and fill any cesspools.

Nitrate

(Reported as Nitrogen)

Guideline: 10 mg/L (milligrams per liter). 25.4% of Kansas wells exceeded that level.

Health Effects

Nitrate is especially harmful to children less than a year old, whose digestive tract contains bacteria that convert nitrate into nitrite.

Nitrite is easily absorbed into the bloodstream, where it keeps hemoglobin from carrying oxygen. In small children, blueness around the mouth and eyes reveals this lack of oxygen in "blue baby syndrome."

At about six months, the stomach starts to produce hydrochloric acid that kills these bacteria, allowing older children and adults to pass nitrate through their system. Nitrate then concentrates in animal and human waste.

Nitrate nitrogen levels of 10-20 mg/L pose a risk to pregnant women and children under one year of age. Levels of 20-40 mg/L pose a danger to a wider range of people and livestock. Levels above 40 should not be drunk by humans or livestock.

Reducing Nitrate Risks

Because nitrate is tasteless, odorless, and colorless, well water should be sampled at least annually.

Nitrate enters the water from manure, human waste, compost, fields, and fertilizer spills. Highly soluble, nitrate usually pollutes the groundwater by leaching. When more fertilizer is applied than plants can utilize, the excess moves through the soil to the groundwater.

When fertilizer is applied through the irrigation system, check valves should prevent back-siphoning into the well. Kansas law requires chemigation wells be registered and check valves installed.

Besides storing and working with fertilizer far from the well and cleaning equipment in the fields, animal waste should not be left to accumulate, but spread on

fields.

There are three methods to remove nitrate from water - distillation, reverse osmosis, or anion exchange. The best treatment depends on the the water quality and quantity, amount of nitrate, and cost.

Bacteria

Guidelines: No colonies present.

E.coli and total coliform. 45 % of Kansas wells tested positive for total coliform; 15.3% for E. coli.

Health Effects

A positive total coliform bacteria reading means disease-causing microorganisms may be present. These organisms can cause diarrhea, abdominal cramps, fever, nausea, vomiting, and other serious illness.

The presence of E. coli in the water shows there is possible fecal contamination. This presents a serious health risk and needs to be corrected immediately.

Reducing Bacteria Risks

If coliform is found, examine the well's construction thoroughly: check for leaks, cracks, breaks, and loose-fitting seals.

The well should be shock chlorinated and a follow-up test done 10 days after chlorination. This involves mixing a strong chlorine solution in the water source and flushing it through the water system.

If fecal coliform or E. coli is found, the water should not be drunk until emergency disinfecting procedures (boiling, chlorine, iodine, etc.) have been done and a negative test result is obtained.

A six-step procedure for shock chlorination is outlined extensively in the Kansas State University Cooperative Extension Service publication *Shock Chlorination for Disinfecting Water Systems:* MF911, available through county extension offices.

Atrazine

Guideline: less than 3 ppb (parts per billion). 17.9% of Kansas wells showed a presence of atrazine, but only one exceeded the guidelines.

Health Effects

Atrazine is a pesticide used on cropland for weed control. It is the most commonly used of the triazine family of herbicides and has a long residual life in water.

EPA guidelines classify atrazine in Cancer Group C - a possible human carcinogen. There is some evidence that it causes cancer as well as liver and heart damage in animals.

Reducing Atrazine Risks

When atrazine is found in wells, it is usually caused by excessive or improper chemical use, backsiphonage into a well, a spill near the well, or an improperly sealed well entrance.

Activated carbon filters are the best available method for removing organic pesticides like atrazine from well water. Activated carbon is not a universal treatment, however, and only a limited number of contaminants will be removed.

Conditions vary among wells, and each owner should obtain expert advice about removing the atrazine risk.

Lead

Guideline: 15 ppb

5.6% of Kansas wells exceeded this level.

Health Effects

Lead accumulates in bones and affects the blood. Children and fetuses are most at risk. Lead can stunt physical growth and result in retardation, kidney and nerve damage, and death.

Reducing Lead Risks

Most lead in Kansas water supplies comes from the plumbing.

The fact that most Kansas water is "hard" helps protect residents, as calcium carbonate builds up in the pipes, creating a barrier between water and the pipes.

If a well tests positive for lead, detailed tests should be conducted by local sanitarians or health department officials. Running water until the water that has been standing in pipes has passed through the faucet removes many of the dangers.

For more information, contact:

Kansas Department of Health and Environment
(785) 296-1529

KDHE Bureau of Water
(785) 296-5500

Your local County Cooperative Extension Service

KSU Extension Agricultural Engineering
(785) 532-5120

Produced by the Kansas Department of Health and Environment, Office of Public Information and Bureau of Water, 1000 SW Jackson, Suite 420, Topeka, KS 66612-1367. This document may be freely copied and distributed so long as the content remains unchanged. Revised 1/98. KPHEIL Pamphlet number: EC5030

KDHE Bureau of Water Web site:
http://www.state.ks.us/public/kdhe/bow.html

County water sanitarians:
http://www.state.ks.us/public/kdhe/bow/lepp/lepp.html